From Disaster Response to Fiscal Strategy: Climate Change Inclusion in Economic Planning in Small Island Developing States (SIDS); a Barbadian Case Study

Shaniah A. Halliday

Shanghai University, College of Liberal Arts

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ABSTRACT

Small Island Developing States (SIDS) such as Barbados face a structural economic paradox: their strive for economic growth whilst facing the constant underdevelopment threat of climate induced events. SIDS economies are acutely exposed to climate-driven shocks, yet their fiscal frameworks have historically been designed to respond to those shocks rather than to anticipate and absorb them. This article examines Barbados's transition from a reactive disaster response model towards a proactive climate-fiscal integration strategy, applying the Vulnerability and Resilience Framework (VRF) as its primary analytical lens. Drawing on secondary sources, including national economic strategies, international programme assessments, IPCC reports, and comparative SIDS policy analyses, the article proceeds in three stages.

First, it diagnoses Barbados's fiscal vulnerability using the three-component framework of exposure, sensitivity, and adaptive capacity. Second, it evaluates the adequacy of existing economic planning instruments including the Barbados Economic Recovery and Transformation (BERT) plan and the medium-term fiscal strategy in integrating climate risk. Third, it proposes a four-component climate-fiscal integration framework comprising climate risk budgeting, contingency reserve mechanisms, debt-for-climate swaps, and climate-responsive medium-term expenditure frameworks. The article contributes to the SIDS fiscal governance literature by demonstrating that the transition from engineering to transformative resilience requires not merely technical adjustments to budget classifications but fundamental institutional redesign: the embedding of climate risk as a sovereign baseline cost rather than an exceptional expenditure.

Barbados can make the shift from engineering to transformative resilience, but it will take a significant institutional overhaul rather than just technical changes to budget classifications. The proposed four-component framework, which is based on debt-for-climate swap agreements, a statutory contingency reserves, climate risk budgeting and a climate-responsive medium-term expenditure framework, is intended to be sequentially implemented within Barbados's current institutional architecture and replicable across similar Commonwealth middle-income SIDS. The creation of a National Climate Finance Office within the Ministry of Finance, the passing of a Climate Change (Fiscal Provisions) Act, and the incorporation of climate-fiscal benchmarks into Barbados's continuing participation in the IMF Resilience and Sustainability Facility are the main enabling conditions. The theoretical contribution of the paper is that it shows that the obstacles to climate-fiscal integration.

Key words: Climate Fiscal Policy, Small Island Developing States, Vulnerability, Barbados

INTRODUCTION

The fiscal cost of climate change on Small Island Developing States is no short of an economic crisis. Demonstrated by the physical and social devastation experienced from climate related events such as hurricanes, floods or heat waves; SIDS are constantly performing a unique balancing act between breaking economic growth barriers and pursuant climate induced underdevelopment. These issues are continuously

honed by their economic vulnerability preceded high debt ratios, over reliance on susceptible financial sectors (tourism, agriculture, and fisheries) and limited access to finance.

The classification of small island nations as Small Island Developing States (SIDS) in 1990s (United Nations, 2014) should be described as a renaissance of perception on the smaller economies in geo-politics and the global economy. Not a perception based on the contention of political confinement or sway for the global agenda but rather a call to the acknowledgement of the structural disadvantages associated with being a Small Island Developing State in the global economy. Major events such as 2017 Hurricane Marria in Domenica and 2024 Hurricane Beryl in Barbados which cost each of these countries a significant economic lost, catalyse a truth that policymakers across the Caribbean had long acknowledged but have ever rarely addressed.

For Small Island Developing States, climate change is not merely an environmental challenge but an inherent fiscal threat. The question confronting Barbadian economic policymakers then, is not whether climate-driven shocks will occur but whether their sovereign fiscal frameworks can absorb them without producing unsustainable debt accumulation, erosion of public services and long-term developmental regression. Barbadian Prime Minster Hon. Mia A. Mottley during her COP27 address, urged a dire attention be made to climate financing as part of fiscal planning, especially in SIDS (UNFCCC, n.d.). Addressing the need for these countries to constantly seek international support. However, what is also noteworthy about her speech was the summon for a new global economic financial structure (UNFCCC, n.d.).

Despite growing international consensus on the need to mainstream climate risk into national economic planning, small island developing states remain disproportionately reliant on reactive disaster response frameworks that fail to account for the long-term fiscal costs of climate vulnerability. However, the highlight of these vulnerabilities is not the focal point of this discussion but merely the tools in the demonstration of defining the physical contribution of climate change the environment and by extension the economic stability of these states.

Drawing on the Barbadian case, this article identifies the structural conditions under which SIDS can transition from climate disaster response toward climate integrated fiscal strategies, demonstrating that when equipped with appropriate institutional frameworks and international financing mechanisms, small island states possess the policy architecture necessary to embed climate risk into long-term economic planning.

In doing so, this article proposes a replicable model for climate-fiscal integration with significant implications for SIDS-specific climate finance, adaptation policy, and sovereign economic planning at the global level.

Barbados presents a compelling and analytically rich case through which to examine this question. As a middle-income Commonwealth SIDS with a sophisticated institutional architecture, a longstanding engagement with the International Monetary Fund, and a recent history of fiscal crisis followed by structural reform, Barbados occupies an instructive position in the SIDS policy landscape. Since 2018, under the Barbados Economic Recovery and Transformation (BERT) programme, the island has undertaken significant fiscal consolidation reducing a public debt that had reached 158 percent of GDP and rebuilding foreign reserves that had fallen to fewer than six weeks of import cover (IMF, 2025). Yet throughout this reform process, the integration of climate risk into fiscal strategy has remains partial, uneven and reactive rather than structurally embedded.

This article argues that Barbados has undergone a discernible yet incomplete transition, from what the resilience literature terms engineering resilience, the reactive restoration of a prior economic state following a climate shock, towards transformative resilience (the proactive restructuring of fiscal systems to reduce future vulnerability and absorb climate costs as a routine feature of public finance) (Folke et al., 2010). The incompleteness of this transition reflects not a lack of policy ambition (e.g. Barbados's international climate advocacy through the Bridgetown Initiative demonstrates considerable political commitment) but rather a set of institutional, legislative, and technical barriers that prevent the systematic integration of climate risk into the architecture of fiscal planning. Identifying and addressing these barriers is the central practical contribution of this article.

The analysis proceeds in five further stages. Firstly, a review of the existing literary scholarship on SIDS climate vulnerability, fiscal governance, and resilience theory, this provides a starting point information gaps which this case study seeks to fill. Secondly, the layout of the vulnerability and resilience framework as an analytical lens, as well as introducing the three-stage diagnostic-analytical-prescriptive model. The third phase seeks to apply the framework to the case of Barbados by examining and highlighting its fiscal vulnerability to climate change through analysis of historical disaster costs, sectoral exposures, and existing policy mechanisms. The fourth stage proposes a climate-fiscal integration framework. Drawing on comparative SIDS policies, experiences and international financing instruments. The final stage concludes by synthesising the article's theoretical and policy contributions, acknowledging its limitations, and identifying directions for future research.

Methodological note: This article employs a secondary research methodology. Expert interviews, policy-maker consultations, and stakeholder surveys identified in the reviewer feedback as a direction for future research and noted as a limitation were not conducted for this iteration but are recommended as essential components of subsequent empirical work. The article draws on peer-reviewed academic literature, IMF and World Bank reports, national budget documents, IPCC assessment reports, and GCF project documentation. Barbados is treated as an exemplary rather than statistically representative case, selected for its policy significance, data availability, and analytical leverage for understanding climate-fiscal integration challenges across comparable SIDS.

LITERATURE REVIEW

Climate Vulnerability in SIDS

Each climate impact varies and can have profound effects on the social, political, and economic sectors of small islands (McClean et al., 2014). Briguglio (1995, 2004) establishes an authoritative position on the economic vulnerabilities of SIDS and the barriers to fiscal expansion, with distinct regard to the challenges they face. He establishes that SIDS are characterised by structural vulnerability arising from small size, high trade openness, export concentration, import dependence and proneness to natural disasters. He critically distinguishes between inherent economic vulnerability, which policy cannot eliminate, and economic resilience, which deliberate policy can develop (Briguglio et al., 2009). These special disadvantages can be further exacerbated by the physical elements of climate change, including changes in air and sea temperature, precipitation patterns, sea-level rise, and increased frequency of extreme weather events.

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Briguglio establishes an authoritative position in his assessment of the economic vulnerabilities of SIDS and the barriers to fiscal expansion especially with distinct regard to challenges they face. He highlights the ever-gnawing theme in the discourse of SIDS, that their economic vulnerability is associated with various “special disadvantages” (Briguglio, 1995). He classified these disadvantages in five (5) major categories, small size, remoteness and insularity, disaster proneness and environmental fragility. Briguglio distinguished between inherent economic vulnerability, a structural condition that policy cannot eliminate and economic resilience, a state that intentional policy can foster. This distinction is foundation to the argument as it highlights that Barbados cannot eliminate its exposure to climate-driven fiscal shocks, but it can build the institutional and fiscal architecture to absorb them.

These “special disadvantages can further be exacerbated by physical elements of climate change. Some key climate drivers of change which can impact small island states are influx in both in air and ocean temperatures, ocean acidity, rainfall, wind movement(speed and direction) sea level rise, and extreme weather events (McClean et al 2014). McClean et al state that there is often an unclear distinction between the overserved and projected impact of climate change in both literature and dialogue. Despite this, publications have often addressed both aspects of these impacts “ interchangeably” and use the observed impacts (climate driven

events such as extreme weather events) as an analytical prediction of future consequences of climate change (McClean et al 2014).

The scientific foundation for comprehending SIDS vulnerability is significantly strengthened by the IPCC's Sixth Assessment Report, which was released in 2022. The compounding effects of sea-level rise, increased hurricane intensity, coral reef degradation, and freshwater stress are already surpassing the adaptive capacity of many SIDS at current levels of global warming, according to Chapter 15, which is devoted to small islands. These risks will significantly increase under all emissions scenarios above 1.5°C (IPCC, 2022). Barbados is explicitly mentioned in regard to freshwater vulnerability, coastal flooding danger, and interruption to the tourism industry. The research highlights the Caribbean as one of the regions experiencing the most severe mix of physical exposure and little adaptation capability.

Beyond physical exposure, the literature is focusing more and more on the mechanisms of economic amplification through which climate shocks cause fiscal crises in SIDS. According to Mycoo et al. (2022), the tourism industry, which is the main source of foreign exchange for the majority of Caribbean SIDS, is contracting due to climate change. This has a cascade effect on the economy, resulting in lower government revenues, higher emergency spending, declining debt-to-GDP ratios, and limited capacity for long-term public investment. According to the World Bank's examination of the dynamics of SIDS debt (World Bank, 2024), climate catastrophes are statistically linked to notable declines in sovereign creditworthiness, raising the cost of borrowing money from outside sources at the exact moment when fiscal needs are most pressing.

Disaster Response Vs. Fiscal Strategy

The shortcomings of post-disaster funding arrangements and the growing need for climate-responsive budgeting are covered in a separate body of literature on fiscal governance. The most thorough analysis of this issue, from a multilateral policy perspective can be found in the IMF staff climate note on economic principles for integrating climate adaptation into fiscal policy (Bellon et al., 2022). It makes the case that cost-benefit frameworks for adaptation, along with distributional analysis, should be methodically incorporated into national fiscal planning rather than being viewed as extraordinary expenditures brought on by disaster events. Three institutional prerequisites for successful climate-fiscal integration are identified in the Note: medium-term fiscal frameworks that project climate-related costs over planning horizons of at least ten years; budget classification systems that separate climate expenditure from general capital spending; and dependable fiscal space to absorb adaptation costs.

The literature on climate-responsive budgeting in developing nations, which was thoroughly reviewed by Terpstra and Mader (2019) and applied to Pacific SIDS by Carayannis and Lehr (2020), consistently finds a discrepancy between operational implementation and declaratory commitments to climate-aligned fiscal planning. While continuing to finance climate adaptation through emergency supplemental allocations outside of the medium-term fiscal architecture, governments may, in theory, support climate-responsive budget frameworks. This tendency, which this article refers to as declaratory integration, is the main policy issue this paper tackles and is exactly what is seen in Barbados.

Resilience and Fiscal Governance

The application of resilience theory to fiscal governance in developing country contexts is a contemporary development which draws on the foundational ecological resilience literature of Holling (1996) and elaboration by Folke et al. (2010). Holling's original distinction between engineering resilience the speed of return to equilibrium following a disturbance and ecological resilience the magnitude of disturbance a system can absorb while retaining its fundamental structure has been extended by Walker and Salt (2006) and subsequently by Folke et al. (2010) into a three-part typology that distinguishes resilience, adaptability, and transformability. In the fiscal governance context, transformability the capacity to shift a system into a qualitatively different state in response to persistent structural challenges provides the most analytically useful conceptual anchor for the argument of this article.

The institutional dimension of resilience receives particular attention in the work of Eakin and Luers (2006), whose framework for assessing the vulnerability of social-environmental systems identifies governance structures as a primary mediating variable between physical exposure and actual harm. Applied to SIDS fiscal governance, this insight implies that the effectiveness of any climate-fiscal integration strategy depends critically on the quality of the institutional architecture through which it is designed and implemented including the legislative framework for fiscal rules, the technical capacity of budget agencies, the independence of central bank oversight, and the coordination mechanisms between ministries responsible for finance, environment, and planning.

The Gap This Article Fills

Existing literature addresses climate vulnerability and fiscal policy for SIDS as a segregated parallels rather than as integrated framework in dialogue. The SIDS vulnerability literature (Briguglio, 1995, 2004, 2009; IPCC, 2022; Mycoo et al., 2022) provides a comprehensive account of physical and economic exposure but engages less deeply with the specific mechanisms through which fiscal systems can be redesigned to address it. The fiscal governance literature (Bellon et al., 2022; IMF, 2025) provides technically sophisticated frameworks for climate-responsive budgeting but tends to treat SIDS as a variant case within a general developing-country framework rather than as a qualitatively distinct institutional context. The resilience literature (Folke et al., 2010; Holling, 1996; Walker and Salt, 2006) provides the conceptual vocabulary for transformative change but has not been systematically applied to the specific problem of climate-fiscal integration in sovereign economic planning.

This article bridges these three strands by applying the Vulnerability and Resilience Framework to the specific institutional context of Barbadian fiscal governance, using the case to demonstrate what transformative climate-fiscal resilience requires in practice and to propose an operational framework replicable across comparable SIDS.

Theoretical Framework

The Vulnerability and Resilience Framework

The Vulnerability and Resilience Framework (VRF), a frequently used analytical lens in studies of climate change and development, serves as the foundation for this essay. It explores how exposed systems: ecological, economic, and institutional, respond to external shocks and stresses. There are three reasons why the VRF is preferred over other frameworks.

Vulnerability, as defined by Adger (2006) in his foundational review, *is "the state of susceptibility to harm from exposure to stresses associated with environmental and social change and from the absence of capacity to adapt"* -(Adger, 2006, p. 268).

This definition is operationalised through three interacting components that provide some of the analytical structure of this article: Exposure, Sensitivity and Adaptive Capacity.

- **Exposure** refers to the nature and degree to which a system experiences climate-related stressors, encompassing both physical stressors (sea-level rise, hurricane frequency and intensity, rainfall variability, coral reef degradation) and economic stressors that amplify physical damage.

- **Sensitivity** refers to the degree to which a system is affected by a given level of climate exposure. Economic sensitivity is amplified by structural dependence on vulnerable sectors. Barbados's primary dependence on tourism, accounts for an estimated 40% of GDP when direct and indirect contributions are combined (Love & L. Smith , 2023) and its secondary dependence on agriculture and water resources, both highly climate-sensitive, produce a high sensitivity coefficient even under moderate climate stress scenarios.

- **Adaptive capacity** refers to the ability of a system to adjust to climate change, moderate potential damages, and take advantage of opportunities. This is where fiscal strategy becomes operationally central: adaptive capacity is directly constrained or enabled by the quality and flexibility of economic planning frameworks. A government with adequate fiscal space, robust medium-term planning instruments, and access to climate finance will have substantially greater adaptive capacity than one operating under tight debt constraints with reactive, emergency-oriented fiscal mechanisms.

Combined, these three components constitute total vulnerability: the product of exposure and sensitivity, divided by adaptive capacity. Improving adaptive capacity through fiscal reform is therefore the most tractable lever available to SIDS policymakers who cannot reduce their physical exposure.

Engineering Resilience versus Transformative Resilience

The distinction between engineering and transformative resilience, first articulated by Holling (1996) and significantly elaborated by Folke et al. (2010), is central to this article's argument. Engineering resilience characterised by efficiency, constancy, and predictability, and focused on speed of return to a prior equilibrium describes Barbados's policy posture through most of the post-independence period: treating each climate event as an exceptional disruption rather than a predictable feature of the fiscal environment.

Transformative resilience embeds climate risk as a structural feature of fiscal planning, redesigning budget classification systems, medium-term expenditure frameworks, debt management strategies, and institutional coordination mechanisms to reflect the reality that climate-driven shocks are not exceptional but routine. The transition from disaster response to fiscal strategy he subject of this article is, in these terms, the transition from engineering to transformative resilience.

Institutional Vulnerability and Fiscal Governance

The institutional dimension of the VRF, drawn from Eakin and Luers (2006) and developed in the SIDS governance literature by Mycoo et al. (2022), constitutes the third theoretical pillar. Institutional vulnerability the inability of government systems to anticipate, absorb, and adapt to climate risk manifests in four forms: weak inter-agency coordination; insufficient technical capacity for climate risk modelling; absence of legislative frameworks mandating climate risk disclosure; and limited domestic political economy incentives for long-term climate fiscal planning within short electoral cycles.

This concept is particularly relevant to Barbados because its international climate policy position is substantially more advanced than its domestic institutional architecture. The country advocates globally for the very reforms it has not yet implemented domestically a paradox that this article analyses and addresses.

The Three-Stage Analytical Model

The VRF is operationalised in this article through a three-stage model in its examination of the Barbadian case.

***Stage 1, Diagnosis*:** Identifying Barbados's specific fiscal exposure through historical disaster costs, debt trajectories, sectoral vulnerabilities, and budgetary impacts.

Stage 2, Analysis of Existing Mechanisms: Evaluating the extent to which current economic planning instruments national budgets, BERT, MTFS, debt management strategies incorporate or fail to incorporate climate risk.

Stage 3, Pathways to Resilience: Proposing a four-component climate-fiscal integration framework drawing on comparative SIDS cases and international financing instruments, supported by scenario-based fiscal projections.

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The Barbadian Case: Diagnosis of Fiscal Vulnerability

Barbados has proven itself a major climate advocate, particularly on climate finance. It exhibits the defining characteristics of SIDS fiscal vulnerability in acute form: a small and open economy (GDP of approximately USD 5.7 billion), high dependence on a single climate-sensitive sector, a history of climate-related fiscal disruption, and limited fiscal space following a decade of structural adjustment. Unlike many smaller SIDS, Barbados has a sufficiently developed institutional infrastructure to make climate-fiscal integration technically feasible: an independent central bank, a functioning parliamentary budget process, established relationships with the IMF and World Bank, and active GCF engagement. The barriers are institutional and political rather than purely technical.

Barbados's significance extends beyond its size. As the originator of the Bridgetown Initiative, it has positioned itself as a thought leader in global climate finance reform (Masterson, 2023; UNFCCC, 2022). Its domestic fiscal architecture therefore carries symbolic as well as practical importance: inconsistencies between international advocacy and domestic policy frameworks are visible to the international community and carry implications for its credibility as a climate champion.

Historical Fiscal Costs of Climate Events

The fiscal cost of climate events in Barbados is difficult to quantify precisely because the country, in common with most SIDS, does not systematically classify climate-related expenditure separately from general emergency spending in its budget documentation. However, available evidence from post-disaster assessments, IMF Article IV consultations and Barbados Central Bank reports permit a broadly reliable account of the fiscal burden.

Hurricane Elsa, which impacted Barbados in July 2021, caused an estimated damages of BDS 170 million (approximately USD 85 million), equivalent to approximately 1.5 percent of GDP. Primarily affecting the tourism and accommodation, residential housing, and coastal infrastructure sectors (Barbados Ministry of Finance, 2024). The government financed recovery costs through a combination of contingency reserves, supplementary budget allocations and accelerated disbursements under existing GCF project frameworks. None of which had been specifically pre-allocated for climate-driven expenditure. Hurricane Beryl in 2024 caused more targeted but devastating damage to the fishing industry: 220 of 312 registered boats at the Bridgetown Fisheries Complex were lost, destroyed, or sunk, representing the destruction of approximately 75 percent of the registered coastal fleet and an estimated loss of USD 5.25 million in annual productive capacity (Central Bank of Barbados, 2025).

None the less, the more structurally significant fiscal cost of climate change in Barbados is not the discrete damage of individual hurricane events but the chronic, cumulative erosion of the tourism sector's revenue-generating capacity through the combined effects of beach erosion, coral reef degradation, water stress, and reputational damage associated with increasingly visible climate impacts. The Central Bank's 2025 climate risk assessment, which applied a physical risk scenario analysis to Barbados's financial sector, found that a single severe coastal storm surge event defined as a once-in-150-year event at current sea levels, which becomes significantly more frequent under higher warming scenarios could reduce GDP by more than 7 percent in a single year and generate cascading losses across the tourism, housing, and real estate lending sectors sufficient to threaten the solvency of domestic financial institutions (Central Bank of Barbados, 2025). This finding illustrates the systemic nature of the climate fiscal risk Barbados faces a risk that cannot be managed through supplementary budget allocations alone.

Sectoral Vulnerabilities: The Primary Transmission Channels

Tourism-

The primary channel through which climate risk enters the Barbadian fiscal system. The sector contributes an estimated 40 percent of GDP when direct and indirect effects are combined, provides approximately 50 percent of foreign exchange revenues, and directly employs approximately 15 percent of the formal labour force

(Central Bank of Barbados, 2022). Its climate sensitivity operates through multiple pathways: direct physical damage to accommodation and coastal infrastructure from hurricanes and storm surge; medium-term beach and reef degradation that diminishes the quality and attractiveness of the tourism product; supply-chain disruptions affecting the food service and transport sectors that support tourism; and demand-side effects through which climate-related disruptions at origin markets reduce visitor numbers. The 2011 ECLAC economic impact assessment found that the combined effects of sea-level rise, reduced tourist arrivals, and coral reef loss could generate total economic losses of between USD 5.1 billion and USD 7.5 billion under mid-range scenarios figures that dwarf any existing contingency reserve or emergency financing mechanism available to the Barbadian government (ECLAC, 2011).

Water-

Barbados has no major rivers or surface water bodies; its freshwater supply depends entirely on underground aquifers fed by rainfall. Changing rainfall patterns characterised by increasing dry spell frequency and intensity, interspersed with more intense precipitation events threaten both aquifer recharge rates and water quality, with saltwater intrusion into coastal aquifers emerging as a growing concern (Wellington and Moore, 2001). The fiscal implications of water stress are transmitted through multiple sectors: increased desalination costs for the Barbados Water Authority, agricultural production losses, public health expenditures, and loss of tourism attractiveness. The Water Sector Resilience Nexus for Sustainability (WSRN-S) project, funded by the GCF at USD 27.2 million, represents the most significant investment in climate-proofing the water sector to date, but covers only a portion of the adaptation investment required.

Agriculture and Fisheries-

Both sectors are highly climate-sensitive: agriculture is affected by drought, pest and disease pressures, and extreme rainfall; fisheries by sea surface temperature changes and direct destruction of boat fleets, as demonstrated by Hurricane Beryl in 2024. Fiscal implications include emergency household support, loss of tax revenues, and increased food import costs that pressure foreign exchange reserves.

Coastal Infrastructure-

An estimated 97 kilometres of coastline directly support government, residential, and commercial infrastructure, much constructed to pre-climate-risk standards (Lewsey, Cid and Kruse, 2001). Retrofitting or relocating coastal infrastructure to climate-resilient standards is substantially unquantified in current fiscal planning. The Central Bank's 2025 risk assessment flagged concentrated mortgage lending exposure in high-risk coastal zones as a particular concern, noting that loan defaults following a major storm surge event could impair bank capital and require government support.

Current Policy Mechanisms: Presence and Absence of Climate Integration

An assessment of Barbados's principal fiscal planning instruments by the International Monetary Fund in 2025 reveals a consistent pattern: climate change is acknowledged as a contextual challenge but is not operationally embedded in the fiscal architecture. The BERT programme documentation, which defines the medium-term fiscal strategy through which Barbados is exiting its IMF Extended Fund Facility, focuses primarily on debt reduction, revenue mobilisation, and public expenditure rationalisation. Climate risk appears in the programme documentation primarily as an external shock scenario a factor that could disrupt fiscal consolidation rather than as a structural feature that the programme itself must address (IMF, 2025).

The national budget documents for the period 2019 to 2024, reviewed for this article, do not contain a dedicated climate expenditure classification or a systematic assessment of climate-adjusted fiscal projections. Capital expenditure on climate-related infrastructure renewable energy installations, coastal protection works, water system upgrades is recorded under general capital spending categories that do not permit the identification, tracking or reporting of climate adaptation investment as a distinct fiscal category. This absence of climate budget tagging means that Barbados cannot currently determine how much of its public investment budget is directed towards climate adaptation, making it impossible to assess whether the investment level is

adequate, to report climate expenditure to international financing bodies, or to hold government agencies accountable for climate adaptation commitments.

The Medium-Term Fiscal Strategy (MTFS) similarly contains no climate-adjusted revenue projections that account for the expected long-term decline in tourism receipts associated with climate degradation of the natural environment, no contingency reserve explicitly designated for climate events, and no debt management strategy that accounts for the potential fiscal liability represented by climate-contingent infrastructure losses. In short, the fiscal architecture treats climate change as an external risk to be managed after the fact rather than as a structural feature of the fiscal environment to be managed proactively.

The Governance Gap

The institutional barriers preventing climate-fiscal integration in Barbados can be organised under four headings, drawing on the institutional vulnerability framework of Eakin and Luers (2006):

Inter-agency coordination-

Climate adaptation planning in Barbados is distributed across multiple agencies the Ministry of Finance, the Ministry of Environment, the Bureau of Standards, the Barbados Water Authority, and the Town and Country Development Planning Office that do not share a common framework for climate risk assessment, do not jointly develop climate expenditure projections, and do not coordinate their investments to maximise adaptation co-benefits. The absence of a national climate change adaptation coordination mechanism with fiscal authority represents the most significant single institutional gap.

Technical capacity-

The quantitative assessment of climate fiscal risk includes the forward-looking projections of climate-adjusted tax revenues, insurance liability, coastal infrastructure replacement costs, and water system investment requirements requires specialist technical capacity in both climate science and fiscal modelling. This capacity is not currently embedded within the Ministry of Finance or the Central Bank, meaning that climate risk enters fiscal planning primarily through qualitative acknowledgement rather than quantitative integration.

Legislative framework-

Barbados does not have legislation mandating climate risk disclosure in public sector financial reporting, nor does it have a statutory requirement for climate adjustment in medium-term fiscal frameworks. The fiscal rules established under the BERT programme focus on debt-to-GDP targets and primary balance requirements but do not include climate contingency provisions or sustainability criteria that would require climate risk to be factored into compliance assessments.

Political economy. The benefits of initiative-taking climate-fiscal integration are long-term and diffuse, while the fiscal costs are immediate and concentrated. Electoral incentives therefore tend to favour reactive disaster response, which produces visible, attributable recovery spending, over preventive fiscal planning that reduces costs gradually over decades. This political economy challenge is not unique to Barbados but is particularly acute in small island democracies where the interval between major climate events is short enough to maintain public salience but long enough to interrupt fiscal planning cycles.

From Response to Strategy: A Climate-Fiscal Integration Framework

Comparative SIDS Cases: Lessons from Jamaica, Fiji, and the Maldives

Three comparable SIDS cases Jamaica, Fiji, and the Maldives provide the comparative validation base for the proposed framework and illustrate transferable lessons across different institutional contexts.

The position of Jamaica

Jamaica has been among the most active Caribbean SIDS in developing climate-responsive fiscal instruments. Its Climate Change Act of 2015 established a statutory framework for climate adaptation planning and created the National Climate Change Advisory Committee, which includes representation from the Ministry of Finance. Jamaica has also experimented with climate budget tagging, a system of classifying budget expenditure by its climate relevance, through a pilot programme supported by the Inter-American Development Bank. However, the tagging system has remained largely administrative rather than strategic: it records climate expenditure without generating the forward-looking projections or accountability mechanisms that would make it a genuine tool for climate-fiscal integration (Caribbean Development Bank, 2022). The lesson from Jamaica is that climate budget tagging is a necessary but insufficient condition for transformative resilience; it requires complementary reforms in medium-term planning and legislative mandates to be effective.

The position of Fiji

Fiji has developed one of the most comprehensive climate-fiscal integration frameworks among Pacific SIDS, including a dedicated Climate Vulnerability Assessment (2017), a Green Bond framework (2017 was the first sovereign green bond issued by a developing country), and a systematic programme of embedding climate risk scenarios into its Medium-Term Fiscal Strategy. Fiji's experience demonstrates that transformative climate-fiscal integration is achievable in a middle-income SIDS with a proactive government and international technical support. The key enabling conditions were: strong political leadership at the Prime Ministerial level; technical assistance from the World Bank and IMF in developing climate-adjusted fiscal modelling capacity; and access to concessional climate finance that reduced the fiscal cost of transition (World Bank, 2018). The lesson for Barbados is that the governance and technical barriers to climate-fiscal integration are surmountable given the right combination of political commitment, international support, and institutional sequencing.

The position of the Maldives

Maldives presents a cautionary tale. Despite exceptionally acute physical climate vulnerability the majority of its land area lies less than one metre above mean sea level the Maldives has struggled to translate climate urgency into fiscal reform. Its climate adaptation plans have been developed in isolation from the Ministry of Finance, funded primarily through external grants rather than integrated into the national budget. Consequently they have lacked the legislative anchoring that would ensure continuity across administrations (IPCC, 2022). The result is a pattern of climate adaptation investment that is externally dependent, institutionally fragile, and disconnected from domestic fiscal sustainability planning. The lesson for Barbados is the risk of over-reliance on international financing as a substitute for domestic institutional reform: international climate finance can supplement a strong domestic framework but cannot replace one.

The Proposed Framework: Four Components of Climate-Fiscal Integration

Drawing on the diagnostic findings of the Barbadian case and the comparative lessons, this article proposes a four-component climate-fiscal integration framework for Barbados, designed to be sequentially implementable and replicable across comparable Commonwealth middle-income SIDS.

Component 1: Climate Risk Budgeting

Climate risk budgeting refers to the systematic classification, tracking, and reporting of climate-relevant expenditure within the national budget. It encompasses three operational elements: (i) the development and application of a climate budget tagging system that classifies recurrent and capital expenditure by its climate relevance (adaptation, mitigation, or climate-neutral); (ii) the integration of climate risk scenarios into revenue projections, accounting for the expected long-term effects of climate change on the primary revenue-generating sector of tourism; and (iii) the publication of an annual Climate Fiscal Statement alongside the national budget, disclosing the government's climate expenditure, revenue adjustments, and contingent climate liabilities.

Climate risk budgeting has been piloted in a range of developing country contexts, with technical frameworks developed by the OECD, the IMF, and the World Bank (Bellon et al., 2022). For Barbados, implementation would require the development of a classification methodology appropriate to the specific structure of the Barbadian economy, technical training for the staff of the Ministry of Finance and line ministries, and a legislative or regulatory mandate to ensure consistent application. The IMF's Resilience and Sustainability Facility, under which Barbados currently operates, could provide a vehicle for integrating climate risk budgeting requirements into the existing fiscal framework conditionality.

Component 2: Climate Contingency Reserve Mechanism

A climate contingency reserve is a dedicated fiscal buffer that is pre-positioned to absorb the immediate fiscal impact of climate events without requiring emergency borrowing or supplementary budget allocations. Unlike general contingency reserves, a climate contingency reserve is capitalised on the basis of a quantitative assessment of annual expected climate-related fiscal exposure incorporating probability-weighted estimates of hurricane damage, drought-related agricultural losses, and coastal infrastructure repair costs and is governed by disbursement rules that require evidence of climate causation.

The Caribbean Catastrophe Risk Insurance Facility (CCRIF) provides a partial analogue, offering parametric insurance products that generate rapid payouts following defined climate trigger events. However, CCRIF payouts are typically insufficient to cover the full fiscal impact of major events and are not integrated into medium-term fiscal planning frameworks. A domestic climate contingency reserve, capitalised at 2–3 percent of GDP based on historical climate damage estimates and invested in liquid assets, would complement CCRIF coverage and provide a domestic fiscal stabilisation mechanism that reduces the government's reliance on emergency borrowing following climate events.

Component 3: Debt-for-Climate Swaps

Debt-for-climate swaps arrangements under which external creditors agree to reduce or restructure debt obligations in exchange for commitments to invest the freed fiscal resources in climate adaptation represent a potentially significant source of financing for climate-fiscal integration in Barbados. The country's outstanding IMF Extended Fund Facility obligation (SDR 42,525 thousand as of December 2022) and its broader external debt portfolio create potential for structured debt-for-climate arrangements that could generate fiscal space for adaptation investment without increasing the overall debt burden (IMF, 2025).

The Bridgetown Initiative explicitly advocates for the scaling up of debt-for-nature and debt-for-climate swap arrangements as a mechanism for addressing the climate financing gap in SIDS (Masterson, 2023). For Barbados, a debt-for-climate swap programme structured in coordination with bilateral creditors and the Caribbean Development Bank could generate an estimated USD 50–100 million in freed fiscal resources over a five-year implementation period, conditional on verifiable climate adaptation investment in the water, coastal infrastructure, and renewable energy sectors. The precedent of Belize's 2021 debt-for-nature swap the largest in history at the time, generating USD 180 million for marine conservation demonstrates the feasibility of such arrangements in a Caribbean SIDS context (World Bank, 2022).

Component 4: Climate-Responsive Medium-Term Expenditure Framework

A climate-responsive Medium-Term Expenditure Framework (MTEF) embeds forward-looking climate risk scenarios into the government's medium-term fiscal planning architecture, typically covering a horizon of three to five years. For Barbados, a climate-responsive MTEF would incorporate: (i) climate-adjusted GDP growth projections that account for the expected trajectory of tourism sector revenue under different warming scenarios; (ii) a climate adaptation expenditure envelope a ring-fenced allocation within the capital budget explicitly designated for climate resilience investment benchmarked to the country's nationally determined contribution and GCF project pipeline; (iii) contingent liability accounting for climate-related public sector exposures, including government-backed insurance obligations, coastal infrastructure replacement costs, and housing support commitments to climate-displaced households; and (iv) debt sustainability analysis conducted

under climate-stressed scenarios that test the fiscal framework against the possibility of a major climate event occurring during the planning period.

The IMF Staff Climate Note framework (Bellon et al., 2022) provides the technical methodology for climate-adjusted fiscal projections, and the IMF's ongoing engagement with Barbados under the Resilience and Sustainability Facility creates a natural implementation vehicle. The critical governance condition is that the climate-responsive MTEF be endorsed at the ministerial level, integrated into the annual budget process, and subject to independent audit conditions that require legislative rather than merely administrative action.

Implementation Roadmap: Climate-Fiscal Integration Framework for Barbados

Phase	Actions	Timeline	Resources Required	Key Barriers
Phase 1: Foundation	Establish National Climate Finance Office; commission national climate risk register; develop climate budget tagging classification methodology; negotiate RST climate-fiscal benchmarks with IMF	Years 1–2 (2026–2027)	USD 2–3 million (technical assistance); GCF readiness grant; IMF capacity development support	Inter-agency turf protection; limited Ministry of Finance technical capacity; electoral cycle interruption
Phase 2: Legislation and Reserve	Enact Climate Change (Fiscal Provisions) Act; capitalise climate contingency reserve at 1.5% GDP; launch first annual Climate Fiscal Statement; initiate debt-for-climate swap negotiations	Years 2–4 (2027–2029)	USD 75–100 million reserve capitalisation (phased); parliamentary drafting support; bilateral creditor engagement	Parliamentary opposition; fiscal space constraints during BERT consolidation; creditor negotiation complexity
Phase 3: Full Integration	Publish first climate-responsive MTEF; integrate climate stress testing into debt sustainability analysis; scale GCF pipeline to full programme; report to international climate finance bodies	Years 4–6 (2029–2031)	Ongoing IMF RST and GCF project financing; domestic fiscal reallocation approximately 1% GDP per annum	Institutional continuity risk across administrations; capacity to produce credible climate-adjusted fiscal projections

International Financing Mechanisms

The proposed four-component framework is not self-financing. Its implementation requires a combination of domestic fiscal reallocation and international climate finance. Three international mechanisms are particularly relevant:

The Green Climate Fund has already demonstrated its willingness to finance climate adaptation in Barbados through eight approved projects totalling approximately USD 180 million in grant and concessional financing. The scaling up of GCF engagement including the development of a GCF country programme that integrates the proposed framework's four components into a coherent pipeline of bankable projects would provide a significant source of financing for climate-fiscal integration. The precondition is the development of a national GCF country programme document that maps GCF financing to the specific adaptation investment needs identified through climate risk budgeting.

The IMF Resilience and Sustainability Trust (RST), which Barbados is already drawing under the Resilience and Sustainability Facility, provides concessional financing specifically linked to climate resilience reforms. The RST's conditional structure which requires demonstrable progress on climate vulnerability reduction as a disbursement condition creates a direct incentive mechanism for the implementation of the proposed framework. Future RST programme negotiations could incorporate specific benchmarks related to climate budget tagging, contingency reserve capitalisation, and MTEF reform.

The Caribbean Development Bank's climate finance windows, including its Climate Resilience Fund and its Disaster Mitigation Facility, provide additional sources of grant and concessional financing for specific

adaptation investments. Barbados's strong institutional relationship with the CDB it is a founding member and significant shareholder positions it well to access these facilities at scale.

Implementation Conditions

The successful adoption of the proposed framework requires three categories of precondition. First, institutional preconditions: the establishment of a National Climate Finance Office, housed within the Ministry of Finance but with a mandate to coordinate across the Ministries of Environment, Planning, Tourism, and Agriculture; the development of a national climate risk register that catalogues and quantifies the government's climate-related fiscal exposures; and the negotiation of a cross-ministry climate adaptation coordination protocol that assigns clear accountability for climate expenditure commitments.

Second, legislative preconditions: the enactment of a Climate Change (Fiscal Provisions) Act that mandates climate risk disclosure in public sector financial reporting, establishes the climate contingency reserve as a statutory fund, and requires climate stress-testing in debt sustainability analysis. Legislative anchoring is essential to ensure continuity across administrations and to provide the legal basis for climate budget tagging requirements.

Third, technical and capacity preconditions: the recruitment or secondment of climate fiscal specialists to the Ministry of Finance; the commissioning of a comprehensive national climate risk and loss assessment that provides the quantitative foundation for climate budget tagging; and the establishment of a climate fiscal data platform that integrates meteorological, economic, and fiscal data for continuous climate risk monitoring.

CONCLUSION

The central argument of this article was to highlight the global economic structural challenges which SIDS face in climate response by examining the experiences of Barbados. Through the course of this research, it was discovered that Barbados's relationship with climate-driven fiscal risk is characterised by a structural gap between the sophistication of its international climate advocacy and the adequacy of its domestic fiscal architecture for climate integration. Applying the Vulnerability and Resilience Framework to the specific institutional context of Barbadian fiscal governance, the article has demonstrated that the island faces high levels of fiscal vulnerability across all three dimensions exposure, sensitivity, and constrained adaptive capacity and that its existing fiscal planning instruments treat climate change as an exceptional external shock rather than a structural feature of the sovereign fiscal environment.

The theoretical contribution of this article lies in its application of the engineering resilience versus transformative resilience distinction to the specific problem of fiscal governance in SIDS. The article demonstrates that the transition from disaster response to fiscal strategy is not primarily a technical challenge the tools of climate risk budgeting, contingency reserves, debt-for-climate swaps, and climate-responsive medium-term expenditure frameworks are all well-developed and available but an institutional and political economy challenge. The barriers are inter-agency coordination, technical capacity, legislative mandates, and political will.

The policy implications of the analysis are specific. For the Government of Barbados, the priority actions are the enactment of a Climate Change (Fiscal Provisions) Act, the establishment of a National Climate Finance Office within the Ministry of Finance, and the initiation of climate risk budgeting in the next annual budget cycle. For CARICOM and regional bodies including the Caribbean Development Bank, the priority is the development of a regional climate fiscal standards framework that enables comparable SIDS to implement similar reforms with shared technical support and coordinated access to international financing. For the IMF and World Bank, the priority is the integration of climate-fiscal integration benchmarks into programme conditionality and technical assistance programmes for SIDS, building on the existing RST framework.

This analysis has several limitations that should be acknowledged. The secondary research methodology, while appropriate for a policy-oriented analysis, does not permit the primary data collection including interviews with fiscal authorities, budget officials, and climate adaptation practitioners that would provide richer insights into the political economy of climate-fiscal integration in Barbados. The case study methodology, treating Barbados as an exemplary case, limits the generalisability of specific findings to other SIDS, though the

analytical framework and proposed reform architecture are designed to be adaptable. The absence of econometric modelling means that the quantitative estimates cited in this article, projected GDP losses, contingency reserve sizing, debt-for-climate swap proceeds are indicative rather than precise.

Future research should address these limitations through primary data collection on the political economy of climate-fiscal integration in Barbados and comparable SIDS; comparative multi-country studies that test the applicability of the proposed framework across different institutional contexts; and longitudinal analysis of the fiscal outcomes of SIDS that have implemented climate-fiscal integration reforms, to generate an evidence base for the effectiveness of specific instruments. The climate crisis will not wait for the development of this evidence base, but the urgency of the policy challenge makes the development of rigorous, empirically grounded guidance all the more important.

Barbados stands at a crossroads. Its international leadership on climate finance reform, its institutional capacity, and its existing engagement with the GCF and the IMF's RST create a window of opportunity for transformative fiscal resilience that few comparable SIDS currently enjoy. The question is whether the island will and how would use that window to redesign its fiscal architecture for the climate it faces or continue to respond, event by event, to a future that is already arriving.

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